

Quantum Numbers – Worksheet 2

1. For each value of l , identify the orbital name (s, p, d, f , etc), the shape, and the possible values of m_l .

	Orbital Name	Shape	Possible values of m_l
$l = 0$			
$l = 1$			
$l = 2$			
$l = 3$			

2. Provide the all the possible values for the other three quantum numbers for electrons in:

a. $n = 2$

	Possible Values	
l		
m_l		
m_s		

b. $n = 3$

	Possible Values		
l			
m_l			
m_s			

3. Which of the following represents a permissible set of quantum numbers? (answer “yes” if permissible and “no” if not permissible)

	n	l	m_l	m_s	Permissible? (If not, why?)
a.	2	2	1	-1/2	
b.	5	1	0	+1/2	
c.	6	3	-2	+1/2	
d.	7	0	0	-1/2	
e.	4	1	3	+1/2	
f.	1	1	0	+1/2	
g.	2	3	-2	-1/2	

4. How many electrons in an atom can have the quantum numbers starting with:

- a. $n = 4, l = 3$
- b. $n = 2, l = 1, m_l = -1$
- d. $n = 3, l = 2$
- e. $n = 3$

5. Write the values for the quantum numbers for the **bold** electron(s) in the following orbital diagrams (note that the orbital name and the possible m_l values are provided).

